

# Exhibit 13

Stephen M. Lagana, M.D.

**1- Date Prepared**

April 5, 2021

**2- Demographics**

**Stephen M. Lagana, M.D.**

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Place of Birth: Queens, NY

Citizenship: **USA**

**3. Academic appointments**

**Associate Professor of Pathology and Cell Biology, Columbia University**, Dec 2018-present

**Assistant Professor of Pathology and Cell Biology, Columbia University**, July 2012-Dec 2018

- **Education**

1. University of Pittsburgh School of Medicine. M.D. – 2008
2. Hofstra University, BA – 2004

- **Training**

1. **Gastrointestinal, liver, and surgical pathology** fellowship, Columbia University/NY Presbyterian Hospital– 2011-2012
2. **Anatomic Pathology** residency, Columbia University/NY Presbyterian Hospital- 2008-2011

- Gaps in Work/Training: N/A

- **Licensure and Board Certification**

1. NY State 2011-present
  - License number: 260133-1
2. Certified in Anatomic Pathology by American Board of Pathology – 2011-present

- **Honors and Awards:** Robert Lee Award for outstanding medical student in Anatomic Pathology. University of Pittsburgh Medical Center; Department of Pathology. 2008

- **Academic Service:**

1. **United States and Canadian Academy of Pathology**

- Abstract review committee, section of gastrointestinal pathology; 2019-present

2. **New York Pathologic Society**

- Member of Nominating Committee 2017-2020
  - Select candidates with 2 other committee members for officer positions in NYPS. Report to Board of Directors

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- Member of Technology Committee 2017-2020
  - Interfaced with outside contractors to design and launch new website – currently operational
- Member of Planning Committee 2014-2016
  - Select lecture topics and invite guest speakers
- Director of social media outreach via @NYPathSociety twitter handle, 2015-2017
  - Promote upcoming meetings and share interesting posts related to pathology

**3. Roger C. Haggitt Gastrointestinal Pathology Society (GIPS)**

- **Travel and Awards Committee** (2019-2021). This 4 member committee selects residents to receive a financial reward to attend the annual USCAP meeting and selects the best resident abstracts in gastrointestinal pathology at the annual USCAP meeting.

**4. College of American Pathologists**

- **Professional Affairs Committee**, Junior Member (January 2010-December 2011). Junior member of national committee tasked with addressing challenges to the specialty of pathology. Specific concerns include ending abusive self-referral practices, finding innovative ways to deliver the most value to patients and clinicians through optimization of pathology reports and information management systems, private sector advocacy, and the role of the pathologist in accountable care organizations (ACO).
- **Spokesperson**, as a CAP spokesperson, I am tasked with raising awareness of the profession of pathology while disseminating useful healthcare related information to the public. I have given radio interviews on subjects ranging from colon cancer to Pap tests which have been broadcast on hundreds of radio stations including the Associated Press Radio Network and Armed Forces Radio.

- **Committees and Organizations**

- **Member of the following organizations**

- College of American Pathologists 2008-present
- United States and Canadian Academy of Pathology 2010-present
- New York Pathological Society 2013-present
- Roger C. Haggitt Gastrointestinal Pathology Society (GIPS) 2015-present
- North American Society for the Study of Celiac Disease 2015-present
- Hans Popper Hepatic Pathology Society (2019-present)

- **Editorial Board Membership**

- Diagnostic Pathology

- **Peer reviewer**

- Modern Pathology
- Archives of Pathology and Laboratory Medicine
- Histopathology
- Liver Transplantation
- BMC Gastroenterology

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- BMC Cancer
- Oncotarget
- Journal of Clinical Pathology
- Diagnostic Pathology
- **Fellowship and Grant Support**
  1. Current- NA
  2. Past: **American Heart Association Student Scholarship in Stroke and Cardiovascular Disease:** 2005. Studied the molecular biology of sudden cardiac death syndromes in the laboratory of Barry London, MD PhD, University of Pittsburgh Cardiovascular Institute.
- **Educational Contributions**
- **Direct instruction**
  - 2012-current: Instruction of pathology residents and fellows during routine sign out of clinical cases. This teaching takes place at the microscope and involves direct questioning and discussion related to the cases being reviewed.
    - Received an average score of 4.15 on a 5 point scale (5 being the best) when residents evaluated my teaching on 6 questions related to teaching efficacy.
  - 2012-current: Lecturer to pathology residents and fellows. Three 1-hour lectures on small intestinal, gastric, anal pathology. One 1 hour slide session.
  - Lecturer to 2<sup>nd</sup> year Medical Students:
    - 2012-current: 2 lectures during the gastrointestinal disease portion of the 2<sup>nd</sup> year curriculum. These include a combined 2 hour lecture with Dr. Julian Abrams on esophageal disease and an individual 1 hour lecture on non-neoplastic gastric pathology.
      - Was evaluated by >100 students for most recent course and received above average score (6.87 out of 9), which was 3<sup>rd</sup> highest rating in the course.
    - 2012-2015: Lecturer to 1<sup>st</sup> year Medical Students on histology and pathology of the GI tract. This course involved a lecture and workshop with virtual slides.
  - Lecturer to Ph. D. candidates in Cell and Tissue Architecture Course
    - 2012-Current: This is a 2 hour course which includes a review of normal histology of the GI tract and then includes a session at the microscope where common and unusual diseases are reviewed.
  - 2016 to current: Lecture to clinical GI fellows on histopathology of the small bowel.
  - 2019 to current: Lecture to clinical GI fellows on histopathology of inflammatory bowel disease
- **Clinical Activities**
  - July 2012-current: Attending Pathologist, NY Presbyterian Hospital-Columbia University Medical Center.
    - 75% clinical commitment in Anatomic Pathology

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- Review and sign out approximately 2400 specimens per year (most being complicated cases with multiple parts)
  - The case volume is split between gastrointestinal pathology, liver pathology, and general surgical pathology
  - I am the primary pathologist for review of outside consultation slides submitted by the Celiac Disease Center at Columbia University
- Performance of intraoperative consultations, approximately 10 days/year
- Intraoperative consultation and rush biopsy night/weekend call, approximately 40 times per year
- **Clinical leadership positions**
  - January 2015-current: **Director of Quality Assurance, Anatomic Pathology**
    - Responsibilities include setting annual QA agenda and submitting goals and reports to Hospital and University
    - Ensure compliance and successful completion of inspections by CAP, NY State, Joint Commission
      - Have successfully overseen 3 CAP inspections (2015, 2017, 2019) and 2 NY State inspections during my tenure with no significant deficiencies
    - Oversight of each division within Anatomic Pathology, consisting of review of all QA data and periodic inspection of each laboratory in AP
    - Monitor and adjudicate discrepancies with outside hospitals
    - Resolve one-off issues in Surgical Pathology; e.g. issues surrounding patient identification
    - Responding to one-off QA inquiries from NY Presbyterian (generally, QA events regarding multiple departments leading to Root Cause Analysis)
    - Major accomplishments include the following:
      - Won approval from Graduate Medical Education Committee to claim CME credits for daily Surgical Pathology Consensus/QA Conference, which should result in >1000 CME credit hours being awarded to surgical pathologists with no additional costs to the department (Co-direct course with Director of Surgical Pathology)
      - Increased percentage of randomly peer reviewed cases and re-instituted random peer review of GYN cases
      - Established new ongoing peer-performance evaluation (OPPE) metrics in conjunction with Weill Cornell Medical Center to allow unified report for NY Presbyterian
  - March 2020-present: Co-director of COVID-19 digital repository
    - Worked with colleagues within the department as well as at the NIH to establish and implement a protocol allowing major organs from all COVID-19 autopsies to be anonymized, digitized, and shared with the NIH

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- Wrote the IRB for departmental study of non-anonymized COVID-19 patients which allowed for numerous publications documenting COVID injury in various organs (e.g. lung, liver, kidney, placenta, etc).
- January 2015-present: **Co-director of Molecular Testing in Surgical Pathology**
  - Responsibilities include interfacing with surgeons, endoscopists, and oncologists to determine optimal standing order algorithm for molecular testing in various tumor types
  - Operationalizing aforementioned algorithms
  - Take part in related QA activities aimed to reduce turnaround time
  - Establishment of ticketing system for one-off requests which are not part of an algorithm
  - Overseeing clerical staff to ensure that tissue arrives at the appropriate laboratory (in-house or reference)
  - Interface with reference labs as needed
- January 2015-current: Columbia Doctors Quality Committee- (Faculty Practice) – ensure that department practices meet and exceed standards of our NY Presbyterian physicians
- January 2015-current: Columbia Oncology Operations Council –ensure department practices comply with published best practices from various non-pathology accrediting agencies (e.g. NCI, American College of Surgery, etc)
- Other clinical activities
- 2013-present: **Lead Pathologist:** Monthly Small Intestinal Disease Conference, Course Director: Dr. Peter Green. I review, present, and discuss the pathology for unusual, challenging, or otherwise interesting cases of small intestinal disease.
  - Performance evaluation from Dr. Green as follows: “Dr. Lagana possesses a deep and nuanced understanding of the myriad conditions which cause intestinal disease. Furthermore, he is an exemplary presenter at our monthly conference. Residents and fellows regard him as an excellent teacher and the faculty of the Columbia University Celiac Disease Center have great confidence in his abilities.”
- 2020-present: Lead pathologist: Weekly small intestinal transplant conference. Course Director: Dr. Mercedes Martinez. This is an interdisciplinary weekly conference wherein we review intestinal allograft pathology.
- Frequently present at numerous other conferences including:
  - Weekly GI Clinicopathologic Conference
  - Monthly Barrett’s Esophagus Clinicopathologic Conference
  - Bi-weekly Gastric Tumor Board
  - Bi-weekly Pediatric GI Tumor Board

6. NA

## 7. Publications

**Peer reviewed original manuscripts**

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1. Lee M, Kudose S, .... **Lagana SM**. Invasive Carcinoma versus Pseudoinvasion: Interobserver Variability in the Assessment of Left-sided Colorectal Polypectomies. Accepted, pending publication; Journal of Clinical Pathology. 2021
2. Melms J, Biermann J, .....**Lagana SM**.....Izar, B. A molecular single-cell lung atlas of lethal COVID-19. Accepted, pending publication, Nature. 2021.
3. Alpert L, Setia N, Ko HM, **Lagana SM**, Pittman ME, Johncilla M, Drage MG, Zhao L, Salomao MA, Liao X, Choi WT, Jenkins SM, Hart J, Harpaz N, Voltaggio L, Lauwers GY, Odze R, Remotti H, Smyrk TC, Graham RP. Interobserver agreement and the impact of mentorship on the diagnosis of inflammatory bowel disease-associated dysplasia among subspecialist gastrointestinal pathologists. Virchows Arch. 2021 Jan 3. doi: 10.1007/s00428-020-02998-z
4. Desai N...**Lagana SM**...Deshpande V. Temporal and spatial heterogeneity of host response to SARS-CoV-2 pulmonary infection. Nat Commun. 2020 Dec 9;11(1):6319. doi: 10.1038/s41467-020-20139-7.
5. Kmeid M, Zuo C, **Lagana SM**, Choi WT, Lin J, Yang Z, Liu X, Westerhoff M, Fiel MI, Affolter K, Choi EK, Lee H. Interobserver study on histologic features of idiopathic non-cirrhotic portal hypertension. Diagn Pathol. 2020 Oct 23;15(1):129. doi: 10.1186/s13000-020-01049-0.
6. De Michele S, Remotti HE, Del Portillo A, **Lagana SM**, Szabolcs M, Saqi A. SATB2 in Neoplasms of Lung, Pancreatobiliary, and Gastrointestinal Origins. Am J Clin Pathol 2020 Sep 11;aqaa118
7. Van Treeck BJ, Mounajjed T, Moreira RK, Orujov M, Allende DS, Bellizzi AM, **Lagana SM**, Davila JI, Jessen E, Graham RP. Transcriptomic and Proteomic Analysis of Steatohepatic Hepatocellular Carcinoma Reveals Novel Distinct Biologic Features. Am J Clin Pathol 2020 Sep 4;aqaa114. doi: 10.1093/ajcp/aqaa114
8. **Lagana SM**, Kudose S, Iuga AC, Lee MJ, Fazlollahi L, Remotti HE, Del Portillo A, De Michele S, de Gonzalez AK, Saqi A, Khairallah P, Chong AM, Park H, Uhlemann AC, Lefkowitz JH, Verna EC. Hepatic pathology in patients dying of COVID-19: a series of 40 cases including clinical, histologic, and virologic data. Mod Pathol 2020 Aug 13;1-9. doi: 10.1038/s41379-020-00649-x.

***This is the largest series describing liver pathology in patients dying of COVID-19 and the first which includes a detailed histologic description. It is also the first series to subject a sizable cohort to PCR testing, and therefore demonstrating viral particles in liver in approximately ½ of patients (which is a novel observation).***

9. Lee M, Ko HM, Rubino A, Lee H, Gill R, **Lagana SM**. Malakoplakia of the gastrointestinal tract: clinicopathologic analysis of 23 cases. Diagn. Pathol. 2020, Jul 24; 15(1):97

***This is the largest case series of a rare pseudotumor which can occur in the gastrointestinal tract. It is a multi-institutional collaboration.***

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10. Chen DA, Koehne de Gonzalez A, Fazlollahi L, Coffey A, Remotti HE, **Lagana SM**. In Situ Hybridisation for Albumin RNA in Paediatric Liver Cancers Compared With Common Immunohistochemical Markers. J Clin Pathol. 2020 May 29;jclinpath-2020-206663.
11. **Lagana SM**, De Michele S, Lee MJ, Emond JC, Griesemer AD, Tulin-Silver SA, Verna EC, Martinez M, Lefkowitz JH. COVID-19 Associated Hepatitis Complicating Recent Living Donor Liver Transplantation. Arch Pathol Lab Med. 2020 Apr 17. doi: 10.5858/arpa.2020-0186-SA

***This is the first detailed pathologic description of hepatitis associated with the COVID-19 virus.***

12. Ross DS, Liu B, Schram AM, Razavi P, **Lagana SM**, Zhang Y, Scaltriti M, Bromberg JF, Ladanyi M, Hyman DM, Drilon A, Zehir A, Benayed R, Chandarlapaty S, Hechtman JF. Enrichment of Kinase Fusions in ESR1 Wild Type, Metastatic Breast Cancer Revealed by a Systematic Analysis of 4,854 Patients Ann Oncol. 2020 Apr 26:S0923-7534(20)39306-6. doi: 10.1016/j.annonc.2020.04.008.
13. Lee M, Betman S, Iuga A, Yang HM, Fleming J, Green PHR, Lebwohl B, **Lagana SM**. An association between crypt apoptotic bodies and mucosal flattening in celiac disease patients exposed to dietary gluten. Diagn Pathol. 2019 Aug 31;14(1):98. doi: 10.1186/s13000-019-0878-1
14. Yiping Han, Mara Roxana Rubinstein, Jungeun Baik, **Stephen Lagana**, Richard Han, William Raab, Debashish Sahoo, Piero Dalerba, and Timothy C. Wang. Fusobacterium nucleatum promotes colorectal cancer by inducing Wnt/ $\beta$ -catenin modulator Annexin A1. EMBO Rep. 2019 Apr;20(4). pii: e47638. doi: 10.15252/embr.201847638. Epub 2019 Mar 4
15. Jung Hoon Son, Benjamin Lebwohl, Antonia Sepulveda, **Stephen M. Lagana**. Utilization Rate of Helicobacter pylori Immunohistochemistry is Not Associated with Diagnostic Rate of Helicobacter pylori Infection. In Press. Applied Immunohistochemistry and Molecular Morphology (2018).
  - ***This study examines whether expanded ancillary testing aids in the diagnosis of Helicobacter pylori infection in gastric biopsies. We found that it did not, which may allow pathologists to practice more efficiently in an environment of limited resources.***
16. Shafinaz Hussein, Tatyana Gindin, **Stephen M. Lagana**, Carolina Arguelles-Grande, Suneeta Krishnareddy, Bachir Alobeid, Suzanne Lewis, Mahesh Mansukhani, Peter H. Green, Govind Bhagat. Clonal T-cell receptor gene rearrangements in celiac disease: implications for diagnosing refractory celiac disease. Journal of Clinical Pathology. Accepted, in-press (2018).
17. Ladan Fazlollahi, Helen E. Remotti, Alina Iuga, Hui-Min Yang, **Stephen M. Lagana**, and Antonia R. Sepulveda (2017) *HER2* Heterogeneity in Gastroesophageal Cancer Detected by Testing Biopsy and Resection Specimens. Arch Pathol Lab Med. 2018 Apr;142(4):516-522.



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18. Sung D, Iuga AC, Kato T, Martinez M, Remotti HE, **Lagana SM**. Crypt Apoptotic Body Counts in Normal Ileal Biopsies Overlap with Graft Versus Host Disease and Acute Cellular Rejection of Small Bowel Allografts. Hum Pathol. 2016 May 28. pii: S0046-8177(16)30098-3. doi: 10.1016/j.humpath.2016.05.017. [Epub ahead of print] PMID: 27246175
  - ***This study was the first to establish a normal number of crypt apoptotic bodies in unremarkable intestinal biopsies. This was meaningful because the histologic diagnostic criteria for graft versus host disease and acute cellular rejection of an intestinal allograft are considered by many observers to be too permissive (high sensitivity, minimal specificity). We showed that the overwhelming majority of normal biopsies reach these criteria, and that therefore new criteria are needed.***
19. Elizabeth Margolskee; Fei Bao; Anne Koehne de Gonzalez; Roger K Moreira; **Stephen M Lagana**; Anthony N Sireci; Antonia R Sepulveda; Helen E Remotti; Jay H Lefkowitz; Marcela Salomao, MD. Hepatocellular Adenoma Classification: A Comparative Evaluation of Immunohistochemistry and Targeted Mutational Analysis. Diagn Pathol. 2016 Mar 9;11(1):27. doi: 10.1186/s13000-016-0475-5
20. **Stephen Lagana**, Susan Hsiao, Fei Bao, Antonia Sepulveda, Roger Moreira, Jay Lefkowitz and Helen Remotti. HepPar-1 and Arginase-1 Immunohistochemistry in Adenocarcinoma of the Small Intestine and Ampullary Region. Archives of Pathology & Laboratory Medicine Jun 2015, Vol. 139, No. 6 (June 2015) pp. 791-795
  - ***Cancers of the ampulla of Vater can differentiate towards intestinal or pancreatobiliary epithelium. The distinction has significant prognostic significance, but is difficult due to overlapping histology. Here, we demonstrated that HepPar-1 is a good immunohistochemical marker to distinguish these 2 lines of differentiation.***
21. Armando, Del Portillo, **Stephen M, Lagana**, Yuan, Yao, Takeshi, Uehara, Nirag, Jhala, Tapan, Ganguly, Peter, Nagy, Jorge, Gutierrez, Aesis, Luna, Julian, Abrams, Yang, Liu, Randall, Brand, Jorge L, Sepulveda, Gary W, Falk, Antonia R, Sepulveda. Evaluation of Mutational Testing of Pre-neoplastic Barrett's Mucosa by Next Generation Sequencing of FFPE Endoscopic Samples for Detection of Concurrent Dysplasia and Adenocarcinoma in Barrett's Esophagus. J Mol Diagn. 2015 Jul;17(4):412-9
22. **Lagana SM**, Salomao M, Remotti HE, Knisely A.S., Moreira RK. Bile Salt Export Pump: a Sensitive and Specific Immunohistochemical Marker of Hepatocellular Carcinoma. Histopathology. 2015 Mar;66(4):598-602. doi: 10.1111/his.12601.
  - ***This study was the first to establish bile salt export pump as a marker of hepatocellular carcinoma in tissue samples. To date, we are unaware of a more specific marker available for diagnostic use.***
23. Melissa Latorre MD, **Stephen M. Lagana MD**, Daniel E. Freedberg MD, Benjamin Lebwohl MD, Govind Bhagat MD, Suzanne K. Lewis MD, Peter H.R. Green MD.

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- Endoscopic biopsy technique in the diagnosis of celiac disease: one bite or two?  
Gastrointest Endosc. 2015 Jan 29. pii: S0016-5107(14)02380-3
24. **Lagana SM**, Braunstein ED, Arguelles-Grande C, Bhagat G, Green PH, Lebwohl B. Sprue-like histology in patients with abdominal pain taking olmesartan compared with other angiotensin receptor blockers. J Clin Pathol. 2015 Jan;68(1):29-32. doi: 10.1136/jclinpath-2014-202615
25. Hanna RF, Ward TJ, Chow DS, **Lagana SM**, Moreira RK, Emond JC, Weintraub JL, Prince MR. An evaluation of the sensitivity of MRI at detecting hepatocellular carcinoma in cirrhotic patients utilizing an explant reference standard. Clin Imaging. 2014 Jun 4. pii: S0899-7071(14)
26. Hanna RF, Finkelstone LA, Chow DS, Miloushev VZ, Escudero MR, **Lagana SM**, Prince MR. Nephrogenic systemic fibrosis risk and liver disease. Int J Nephrol. 2014;2014:679605. doi: 10.1155/2014/679605. Epub 2014 Mar 23. PMID:24778878
27. **Lagana SM**, Moreira, RK, Remotti HE, Bao F. Glutamine synthetase, Heat-shock Protein 70 and Glypican-3 in Intra-hepatic Cholangiocarcinoma and Tumors Metastatic to Liver. Appl Immunohistochem Mol Morphol. 2013 May;21(3):254-7. doi: 10.1097/PAI.0b013e3182642c9c
28. **Lagana SM**, Salomao M, Bao F, Moreira RK, Lefkowitz, J, Remotti HE. Utility of an Immunohistochemical Panel Consisting of Glypican-3, Heat Shock Protein-70, and Glutamine Synthetase in the Distinction of Low-grade Hepatocellular Carcinoma from Hepatocellular Adenoma. Appl Immunohistochem Mol Morphol. 2013 Mar;21(2):170-6. doi: 10.1097/PAI.0b013e31825d527f
- ***This study examined how to distinguish hepatic adenomas from hepatocellular carcinomas in small biopsies. This is relevant since some adenomas can be treated by cessation of causative agents (e.g. oral contraceptives) whereas carcinomas require surgery. This was the first study looking at these immunohistochemical markers in this setting and the findings have subsequently been replicated in additional studies from other institutions.***
29. **Lagana SM**, Taub RN, Borczuk AC. Utility of Glucose Transporter 1 in the Distinction of Benign and Malignant Thoracic and Abdominal Mesothelial Lesions. Arch Pathol Lab Med. 2012 Jul;136(7):804-9. doi: 10.5858
- ***This study was performed when we noticed that our clinical results with a particular immunohistochemical marker did not agree with the results published in early studies (essentially, the previous studies showed GLUT 1 to be close to 100% sensitivity for the diagnosis of mesothelioma). Therefore, we performed a larger study which demonstrated sensitivity of 50%. Subsequent studies have confirmed our data.***
30. Guo-Xia Tong, Lorenzo Memeo, Cristina Colarossi, Diane Hamele-Bena, Cristina Magi-Galluzzi, Ming Zhou, **Stephen M. Lagana**, Lara Harik, Jennifer M. Oliver-Krasinski, Mahesh Mansukhani, Lorenzo Falcone, Hanina Hibshoosh, and Kathleen O'Toole. PAX8

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and PAX2 Immunostaining Facilitates the Diagnosis of Primary Epithelial Neoplasms of the Male Genital Tract. *Am J Surg Pathol*. 2011 Oct;35(10):1473-83

31. London B, Michalec M, Mehdi H, Zhu X, Kerchner L, Sanyal S, Viswanathan PC, Pfahnl AE, Shang LL, Madhusudanan M, Baty CJ, **Lagana S**, Aleong R, Gutmann R, Ackerman MJ, McNamara DM, Weiss R, Dudley SC Jr. Mutation in glycerol-3-phosphate dehydrogenase 1 like gene (GPD1-L) decreases cardiac Na<sup>+</sup> current and causes inherited arrhythmias. *Circulation*. 2007 Nov 13;116(20):2260-8

#### Review articles

1. El Jabbour T, **Lagana SM**, Lee H. Update on Hepatocellular Carcinoma: Pathologists' Review. *World J Gastroenterol*. 2019 Apr 14;25(14):1653-1665. doi: 10.3748/wjg.v25.i14.1653. Review.
2. **S.M Lagana**, G. Bhagat. Biopsy Diagnosis of Celiac Disease: The Pathologist's Perspective in Light of Recent Advances. *Gastroenterol Clin North Am*. 2019 Mar;48(1):39-51. doi: 10.1016/j.gtc.2018.09.003. Epub 2018 Dec 14. Review.
3. A.K. Koehne de Gonzalez, MD and **S.M. Lagana, MD**. Update on Ancillary Testing in the Evaluation of High-grade Liver Tumors. *Surg Pathol Clin*. 2018 Jun;11(2):367-375. doi: 10.1016/j.path.2018.02.004
4. Gonzalez RS, **Lagana SM**, Szeto O, Arnold CA. Challenges in Diagnosing Medication Resins in Surgical Pathology Specimens: A Crystal-Clear Review Guide. *Arch Pathol Lab Med*. 2017 Feb 7. doi: 10.5858/arpa.
5. Nina Burbure, Benjamin Lebwohl, Peter H.R. Green, Carolina Arguelles-Grande, Govind Bhagat, **Stephen M. Lagana**. Olmesartan Associated Sprue-like Enteropathy: a Systematic Review with Emphasis on Histopathology. *Hum Pathol*. 2016 Apr;50:127-34. doi: 10.1016/j.humpath.2015.12.001
6. Anne K Koehne de Gonzalez, Marcela A Salomao and **Stephen M Lagana**. Current concepts in the immunohistochemical evaluation of liver tumors. *World J Hepatol* 7(10):1403-1411. Published online 2015 June 08. doi: 0.4254/wjh.v7.i10.1403
7. **Lagana SM**, Moreira RK, Lefkowitz JH. Hepatic Granulomas: Pathogenesis and Differential Diagnosis. *Clin Liver Dis*. 2010 Nov;14(4):605-17. PMID: 21055685
8. **Lagana S**, Parwani AV, Nichols L. Cardiac Sarcoidosis. A Pathology Focused Review. *Arch Pathol Lab Med*. 2010 Jul;134(7):1039-46
9. Nichols L, **Lagana S**, Parwani A. Coronary Artery Aneurysm: a Review and Hypothesis Regarding Etiology. *Arch Pathol Lab Med*. 2008 May;132(5):823-8

#### Case reports:

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1. Heinz N, Griesemer A, Kinney J, Vittorio J, **Lagana SM**, Goldner D, Velasco M, Kato T, Lobritto S, Martinez M. A Case of an Infant With SARS-CoV-2 Hepatitis Early After Liver Transplantation. *Pediatr Transplant*. 2020 Jun 19:e13778. doi: 10.1111/petr.13778.
  2. Yang, J, **Lagana SM**, Saenger Y, Carvajal R. Dual checkpoint inhibitor-associated eosinophilic enteritis. *J Immunother Cancer*. 2019 Nov 15;7(1):310. doi: 10.1186/s40425-019-0743-5
  3. Simona De Michele, MD, Tiffany Thomas, PhD, Jennifer M. Vittorio, MD, George A. Diaz, MD, Jay H. Lefkowitz, MD, **Stephen M. Lagana, MD**. A rare case of neonatal intrahepatic cholestasis caused by citrin deficiency in the United States. *AJSP: Reviews and Reports*. 23(5):214-216, September/October 2018.
  4. Hemant Varma, Phyllis L. Faust, Alejandro D. Iglesias, **Stephen M. Lagana**, Karen Wou, Michio Hirano, Salvatore DiMauro, Mahesh M. Mansukani, Kirsten E. Hoff, Peter L. Nagy, William C. Copeland, Ali B. Naini. Whole exome sequencing identifies a homozygous POLG2 missense variant in an infant with fulminant hepatic failure and mitochondrial DNA depletion. *Eur J Med Gen*. 2016
  5. Taylor SA, Vittorio JM, Martinez M, Fester KA, Lagana SM, Lobritto SJ, Ovchinsky N. Anakinra-Induced Acute Liver Failure in an Adolescent Patient with Still's Disease. *Pharmacotherapy*. 2016 Jan 9. doi: 10.1002/phar.1677
  6. Lefkowitz J, Lagana SM, Kato T. Hepatocellular Carcinoma in Noncirrhotic Liver with Glycogenotic Foci: Basic Science Meets Genomic Medicine. *Semin Liver Dis*. 2015 Nov;35(4):450-6. doi: 10.1055/s-0035-1568986
  7. Chen, X., Lagana, SM., Poneros, J., Kato, T., Remotti, F., He, H., Kaminsky, D. and Hamele-Bena, D. (2013), Cytological diagnosis of angiosarcoma arising in an immunosuppressed patient 6 years after multi-visceral transplantation. *Diagn. Cytopathol*. doi: 10.1002/dc.23068
  8. Lagana SM, Hanna RF, Borczuk AC. Pleomorphic (Spindle and Squamous Cell) Carcinoma Arising in a Peripheral Mixed Squamous and Glandular Papilloma in a 70 Year Old Man. *Arch Pathol Lab Med*. 2011 Oct;135(10):1353-6
2. **Invited editorials/Letters to the Editor**
1. Alina C Iuga, Charles C Marboe, Mine M Yilmaz, Jay H Lefkowitz, Cosmin Gauran, and **Stephen M Lagana**. Adrenal Vascular Changes in COVID-19 Autopsies. *Archives of Pathology & Laboratory Medicine* In-Press. <https://doi.org/10.5858/arpa.2020-0248-LE>
  2. **Stephen M. Lagana**, Julian A. Abrams. A phenotypic analysis shows eosinophilic esophagitis is a progressive fibrostenotic disease. *Gastrointest Endosc*. 2014 Apr;79(4):586-8. doi: 10.1016/j.gie.2013.12.008
3. **National/International meeting presentations**
1. **Platforms**

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1. The Duodenal Microbiome in Refractory Celiac Disease, Type 1. **Stephen M. Lagana**, Ian S. Cohn, Mara R. Rubenstein, Benjamin Lebwohl, Peter H.R. Green, Govind Bhagat. 105th Annual Meeting of the United States and Canadian Academy of Pathology, Seattle, WA, USA. 3/15/2016
2. Angiotensin receptor blockers other than olmesartan are not associated with histologic evidence of duodenitis. **Stephen M. Lagana**, Eric Braunstein, Benjamin Lebwohl, Peter H.R. Green. 103rd Annual Meeting of the United States and Canadian Academy of Pathology, San Diego, CA, USA. 3/4/2014
3. Mutational analysis by Next Generation Sequencing of preneoplastic intestinal metaplasia in patients with Barrett Esophagus from endoscopic samples. **Lagana, Stephen M.**; Yao, Yuan; Uehara, Takeshi; Jhala, Nirag, Ganguly, Tapan; Sepulveda, Jorge; Liu, Yang; Brand, Randall; Falk, Gary W. Sepulveda, Antonia R. European Congress of Pathology, 2013, Lisbon, Portugal. 9/1/13.
4. A comparison of the immunophenotype of hepatocellular carcinoma and non-lesional hepatocytes when analyzed with next-generation markers. **Stephen Lagana**, Marcela Salamao, Fei Bao, Roger Moreira, Jay Lefkowitz and Helen Remotti. 100th Annual Meeting of the United States and Canadian Academy of Pathology, San Antonio, TX, USA. 3/1/2012

#### 4. Selected published abstracts and Poster presentations

1. Pseudoinvasion or Invasive Adenocarcinoma? Interobserver Variability in the Assessment of Left Sided Colon Polyps. Lee, Kudose, Del Portillo, Sepulveda, Pittman, Salomao, Ko, Lee, **Lagana**. 109th Annual Meeting of the United States and Canadian Academy of Pathology, Los Angeles, CA, USA 2020
2. Interobserver Agreement and Confidence in the Diagnosis of Inflammatory Bowel Disease-Associated Dysplasia Among Subspecialist GI Pathologists. Alpert, Setia, Ko, **Lagana**, et. Al. 109th Annual Meeting of the United States and Canadian Academy of Pathology, Los Angeles, CA, USA 2020
3. Impact of Mentorship on Interobserver Agreement in Assessment of Inflammatory Bowel Disease-Associated Dysplasia. Alpert, Setia, Ko, **Lagana**, et. Al. 109<sup>th</sup> Annual Meeting of the United States and Canadian Academy of Pathology, Los Angeles, CA, USA 2020
4. Value of Repeat Helicobacter pylori Immunohistochemistry: Good Practice or Flogging a Deceased Horse? **Stephen M. Lagana**, Rebecca Molinsky, Benjamin Lebwohl. 108th Annual Meeting of the United States and Canadian Academy of Pathology, National Harbor, MD, USA 2019
5. Histologic Overlap in Liver Biopsies from Patients With and Without Non-Cirrhotic Portal Hypertension (NCPH): Interobserver Agreement Study. Chunlai Zuo, Jingmei Lin, Kajsa Affolter, **Stephen M. Lagana**, Won-Tak Choi, Xiuli Liu, Eun-Young Karen Choi, Zhaohai Yang, Maria Isabel Fiel, Maria Westerhoff, HwaJeong Lee. 108th Annual Meeting of the United States and Canadian Academy of Pathology, National Harbor, MD, USA 2019

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6. Epstein-Barr Virus Infection in Carcinomas of the Biliary Tract. Michael Lee, Susan Hsiao, Helen E. Remotti, **Stephen M. Lagana**. 108th Annual Meeting of the United States and Canadian Academy of Pathology, National Harbor, MD, USA 2019
7. SATB2 Expression in Primary Pancreatobiliary and Gastrointestinal Neoplasms. Simone de Michele, **Stephen Lagana**, Susan Hsiao, Helen E. Remotti. 108th Annual Meeting of the United States and Canadian Academy of Pathology, National Harbor, MD, USA 2019
8. Mutation Status of Barrett's Esophagus Biopsies Indefinite for Dysplasia Correlates with Outcomes. **Stephen M. Lagana**, Elena Komissarova, Sarawut Kongkarnka, Jorge L. Sepulveda, Antonia R. Sepulveda. Digestive Disease Week, 2017. Chicago, IL
9. In-Situ Hybridization For Glypican-3 RNA Is More Sensitive Than Immunohistochemistry In Hepatocellular Carcinoma. Michael Lee, Anne Koehne de Gonzalez MD, Helen E Remotti MD, Manoj Gandhi MD, PhD, Shauna Levinson, Vikram Deshpande, **Stephen Lagana**. 106th Annual Meeting of the United States and Canadian Academy of Pathology. San Antonio, TX, USA. 2017.
10. Crypt Apoptosis Contributes To Mucosal Flattening In Celiac Disease Patients When Exposed To Dietary Gluten. Michael Lee, Alina Iuga, Hui-min Yang, Jude Fleming, Peter H.R. Green, Benjamin Lebwohl, **Stephen M. Lagana**. 106th Annual Meeting of the United States and Canadian Academy of Pathology. San Antonio, TX, USA. 2017.
11. Feasibility and Utility of In-situ Hybridization for Micro-RNA 21 in Intrahepatic Cholangiocarcinoma. Anthony Rubino, Anne Koehne de Gonzalez, Shauna Levinson, Manoj Gandhi, Helen E. Remotti, **Stephen M. Lagana**. 106th Annual Meeting of the United States and Canadian Academy of Pathology. San Antonio, TX, USA. 2017.
12. In-situ Hybridization for miR-21 in Hepatocellular Carcinoma. Anne Koehne de Gonzalez, Anthony Rubino, Shauna Levinson, Manoj Gandhi, Helen Remotti, **Stephen Lagana**. 106th Annual Meeting of the United States and Canadian Academy of Pathology. San Antonio, TX, USA. 2017.
13. GATA3 Immunohistochemistry in Adenocarcinoma of the Ampullary Region. Sonya Purushothaman MD, Helen E Remotti MD, **Stephen Lagana**, Susan J Hsiao MD PhD, Hui-Min Yang. 106th Annual Meeting of the United States and Canadian Academy of Pathology. San Antonio, TX, USA. 2017
14. In-Situ Hybridization for Albumin RNA in Pediatric Liver Cancers Compared to Common Immunohistochemical Markers. Anne K. de Koehne de Gonzalez, Ladan Fazlollohi, Amy Coffey, Helen E. Remotti, **Stephen M. Lagana**. 105th Annual Meeting of the United States and Canadian Academy of Pathology, Seattle, WA, USA. 3/15/2016. Poster 225
15. Usage of Helicobacter pylori Immunohistochemistry Is Not Associated With the Diagnostic Rate of Helicobacter pylori Infection. Jung Hoon Son, Jill Sink, Benjamin Lebwohl, **Stephen M. Lagana**. 104th Annual Meeting of the United States & Canadian Academy of Pathology March 21-27, 2015 Boston, MA.
16. Histological Features of Colon Allograft in Intestinal Transplant Patients. Alina Iuga MD, Helen Remotti MD, **Stephen M. Lagana MD**, Aesis M. Luna, Armando Del Portillo MD, PhD, Antonia R. Sepulveda MD, PhD. 104th Annual Meeting of the United States & Canadian Academy of Pathology March 21-27, 2015 Boston, MA.



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17. Apoptotic Body Counts in Normal Ileal Biopsies Overlap With Acute Cellular Rejection of Small-Bowel Allografts. Diana Sung, MD; Alina Iuga, MD; Helen Remotti, MD; **Stephen M. Lagana, MD**. Annual meeting of the College of American Pathologists 2015 Annual Meeting (CAP '15). Archives of Pathology & Laboratory Medicine: October 2015, Vol. 139, No. 10, pp. e2-e186
18. Utility of an Immunohistochemical Panel Consisting of Glypican-3, Heat-Shock Protein-70, and Glutamine Synthetase In the Evaluation of Hepatoblastoma. Amy Coffee, **Stephen M. Lagana**, Helen Remotti. 104th Annual Meeting of the United States & Canadian Academy of Pathology March 21-27, 2015 Boston, MA.
19. Use of optical coherence tomography (OCT) in the evaluation of gastric dysplasia. Xu M, **Lagana S**, Sethi A. Presented at Digestive Disease Week, Washington DC 2015
20. Clinical Characteristics, Associated Conditions, and Medication Use in Patients With Lymphocytic Gastritis. Frager S, Lebwohl B, **Lagana SM**, Green PHR. Presented at Digestive Disease Week, Washington DC 2015
21. Histopathologic Outcomes in Olmesartan Related Enteropathy. Akash Goel, Benjamin Lebwohl, Christina A. Tennyson, Suzanne K. Lewis, Carolina Arguelles-Grande, Peter H. Green, **Stephen M. Lagana**. Digestive Disease Week 2014, Chicago, IL, USA. 5/4/2014.
22. HepPar-1 and Arginase-1 in small intestinal and ampullary adenocarcinoma. **Stephen Lagana M.D.**, Susan Hsaio, M.D., Fei Bao, M.D., Antonia Sepulveda M.D. Ph.D., Roger Moreira, M.D., Jay Lefkowitz, M.D., and Helen Remotti, M.D. European Congress of Pathology 2013, Lisbon, Portugal. 9/1/13. Poster 046.
23. Endoscopic Biopsy Technique and Biopsy Orientation in the Evaluation of Celiac Disease. Melissa Latorre MD, **Stephen M. Lagana MD**, Daniel E. Freedberg MD, Benjamin Lebwohl MD, Govind Bhagat MD, Suzanne K. Lewis MD, Peter H.R. Green MD. Digestive Disease Week 2013, Orlando, FL, USA. 8/19/13.
24. Bile Salt Export Pump (BSEP): A Sensitive and Specific Marker of Hepatocytic Differentiation in Liver Tumors. **Lagana SM**, Remotti H, Moreira RK. 101st Annual meeting of the United States and Canadian Academy of Pathology, Vancouver, BC, Canada. Poster #248. Tuesday, March 20, 2012.
25. CD146 Expression in Pleural and Peritoneal Mesothelioma. **Lagana SM**, Taub RN, Borczuk AC. 101st Annual meeting of the United States and Canadian Academy of Pathology, Vancouver, BC, Canada. Poster #296. Wednesday, March 21, 2012.
26. Immunophenotypic Subtypes of Hepatic Adenomas in a Large Tertiary Care Center in the United States. McMillen E, **Lagana SM**, Bao F. 101st Annual meeting of the United States and Canadian Academy of Pathology, Vancouver, BC, Canada. Poster #255. Tuesday, March 20, 2012.
27. Glutamine synthetase, Heat-shock Protein 70, and Glypican-3 in Intra- hepatic Cholangiocarcinoma. **SM Lagana**, Roger K. Moreira, Helen Remotti, Fei Bao. American Society of Clinical Pathology. Las Vegas, NV. October 21, 2011
28. Despite Warning, Gadolinium Is Safe in Patients with Liver Disease. R F Hanna, MD, New York, NY; M R Escudero, MD; V Miloushev, MD; S

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29. **Lagana**; MD; E Kulon, MD; M R Prince, MD, PhD. Radiological Society of North America, 97th Annual meeting. Chicago, IL. November 27, 2011
30. MRI has greater sensitivity than 64-slice CT for detecting hepatocellular carcinoma in cirrhotic patients. Robert F Hanna, **Stephen Lagana**, Roger K Moreira, Inna Postolov, Jean Emond, Martin R Prince. 19th Annual Meeting and Exhibition of the International Society of Magnetic Resonance in Medicine in Montreal, Canada, May 2011.
31. Diagnostic and Histogenetic Significance of PAX2 and PAX8 Expression in Three Uncommon Tumors of the Male Lower Urogenital Tract . **Stephen M. Lagana, MD**, Guo-Xia Tong, MD, PhD, Lorenzo Memeo, MD, Cristina Colarossi, MD, Mahesh Mansukhani, MD, Hanina Hibshoosh, MD, and Kathleen O'Toole, MD. American Society of Clinical Pathology Annual Meeting, October 2010, San Francisco, CA.
32. Glucose Transporter-1 Immunostaining Differentiates Intestinal Metaplasia With Dysplasia From Adenocarcinoma in Barrett Esophagus. **Lagana, SM**, Remotti F, Remotti H. College of American Pathologists Annual Meeting. September 2010, Chicago, IL.
33. Utility of Glucose Transporter 1 in the differentiation of peritoneal and pleural mesothelioma from non-malignant mesothelium. **SM Lagana**, RN Taub and AC Borczuk. United States and Canadian Academy of Pathology 99th Annual Meeting. March 23 2010, Washington, D.C.
34. A Mutation in the Glycerol-3-Phosphate Dehydrogenase 1-Like Gene (GPD1L) Causes Brugada Syndrome. Barry London, MD, PhD, Shamarendra Sanyal, MD, PhD, Michael Michalec, BS, Arnold E. Pfahnl, MD, PhD, Lijuan L. Shang, PhD, Laurie Kerchner, BS, **Stephen Lagana**, BA, Ryan G. Aleong, MD, Haider Mehdi, PhD, Rebecca Gutmann, RN, BSN, Raul Weiss, MD and Samuel C. Dudley, Jr., MD, PhD. Heart Rhythm Society, Boston MA, May 3, 2006.
35. 3D Kinematic Analysis of Antennular Movements of Caribbean Spiny Lobster (*Panulirus argus*) in Response to Food Odorants. **Stephen M. Lagana**, Peter C. Daniel, PhD. Colonial Academic Association annual meeting, Spring 2004

### 3. Invited Lectures/ Visiting Professorships

1. **International**: Moderator – GI pathology platform session. United States and Canadian Academy of Pathology, Los Angeles CA, USA. March 2020.
2. **International**: Liver Pathology in COVID-19. Expert guest for international GI & Liver Pathology Journal club, held virtually via Twitter chat. Sept. 16, 2020
3. **Regional**: Liver Pathology in COVID-19. Columbia University Zuckerman Institute, COVID-19 Symposium. New York, NY. May 6, 2020
4. **National**: Pathology of Celiac Disease. What else could it be? Celiac Disease, Now and the Future. New York, NY 2020



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5. **International:** Update on Intrahepatic Cholangiocarcinoma. Hans Popper Hepatobiliary Pathology Society. 107<sup>th</sup> Annual Meeting of the United States and Canadian Academy of Pathology. Vancouver, BC, Canada. 3/18/2018
6. **National:** Best Practices in Liver Tumor Pathology. Visiting Professor at Albany Medical College, Department of Pathology. 4/9/2018
7. **National:** How to Use (and Not Get Burned by) IHC and ISH in Liver Tumor Pathology. Grand Rounds at Weill Cornell Medical Center, Department of Pathology. November 6, 2017
8. **National:** How to Use (and Not Get Burned by) IHC and ISH in Liver Tumor Pathology. Visiting Professor at University of Chicago Hospital, Department of Pathology. May 5, 2017
9. **International:** A Liver Tumor with an Identity Crisis. Invited presentation at Liver Evening Specialty Conference. 106th Annual Meeting of the United States and Canadian Academy of Pathology. San Antonio, TX, USA. 3/6/2017
10. **Regional:** Villous Atrophy Unrelated to Gluten. Intestinal Immune Based Inflammatory Diseases Symposium. March 8, 2013. Columbia University Faculty House. NY, NY.
11. **Regional:** The Duodenal Microbiome in Refractory Celiac Disease, Type 1. Celiac Disease Center Research Conference. March 1, 2015
12. **Regional:** Angiotensin receptor blockers other than olmesartan are not associated with histologic evidence of duodenitis. Celiac Disease Center Research Conference. February 1, 2014